Article

The effect of school closures on primary science education – a study

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The effect of school closures on primary science education – a study

Cherry Canovan

Teaching and learning science during the school closure period was always going to be a challenge. However, lockdown research conducted by the University of Central Lancashire shows that children from deprived backgrounds are at greatly increased risk of having their scientific aspirations blighted by Covid. Lead researcher Dr. Cherry Canovan considers the problem – and what can be done about it.

As soon as primary schools abruptly closed in late March 2020, we became concerned that science teaching might disproportionately suffer. There was obvious potential for problems: schools might choose to prioritise English and maths, while teachers might find it difficult to set science work, particularly practical experiments, to be done remotely. In addition, parents might be unable to provide the necessary resources, or lack the confidence to support learning in this area.

Our research group decided to document parents' and teachers' real-time experiences during the height of lockdown. We surveyed 182 teachers and 360 parents over three weeks in May, asking about their home-learning experience, with a focus on science.

We expected that the results would show that less science had been taught and studied during the closures, but it was dispiriting to see it laid out in black and white. One-third of teachers reported setting proportionately less science, and the topics taught narrowed, with electricity and sound dropped in favour of nature-based activities that were easier for all to access. Meanwhile far fewer parents reported their children engaging with science learning than with maths/English and, while some embraced extra-curricular activities, one-fifth of households did no science whatsoever.

So far, so grim, but then other research has shown that teaching and learning suffered across the board, so what makes this result different? Well, science education already has a particular, and rather intractable, set of issues attached to it – and the lockdown period has only served to magnify these.

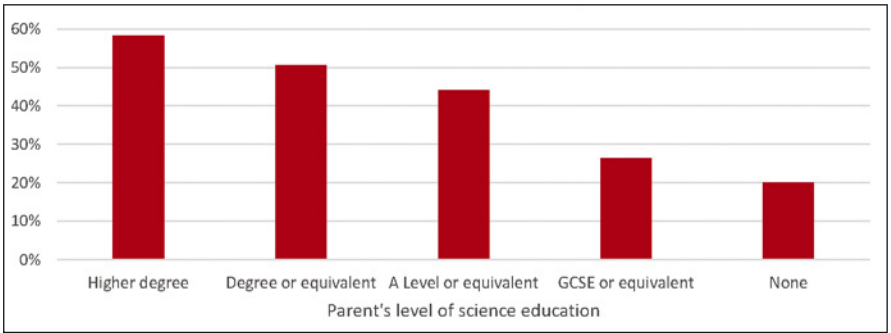
The fact is that science is still disproportionately the preserve of people from affluent backgrounds. There is a strong correlation between parental social class and likelihood of working in science. This should concern us as an issue of equity, but also because, if our nation is to flourish, we need to get more of our best minds working in areas of future growth, such as green technologies and life sciences.

And, sadly, we found clear evidence that teachers working in more deprived areas were struggling to teach science in a way that their counterparts with more affluent catchments were not. When we asked teachers to talk about their experience of translating the science curriculum for home learning, just over a third (36%) of those who described their school as being in an area of low deprivation said that they had found it difficult. However for those teaching in areas of high deprivation, this figure rose to 64% – nearly two-thirds.

Concerns included whether families would be able to provide the necessary resources for science work or would have the knowledge to support it. Internet access was also a big issue – while some teachers in less deprived areas pointed to the myriad of science resources for children that are available online, those in areas of high deprivation told a story of families where several children had to share a single phone as their sole Internet access.

Some teachers had even decided to teach no science for these reasons. One told us: '*We are reluctant to post activities as we're aware that many children won't have the materials (e.g. sand, rice, peas) and equipment (e.g. funnel, filter paper, sieve) to carry out their investigations. We could share links to videos, but that's very passive. So we've decided to wait to give everyone a fair chance*'.

Meanwhile, as expected, parents with science qualifications felt much more



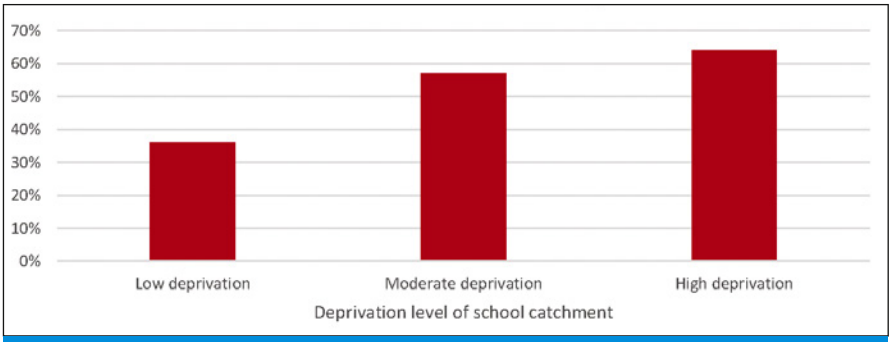
Percentage of parents agreeing that 'I am very comfortable helping my child with science learning'.

able to support their child's learning in this area. Some had carried out sophisticated extra-curricular activities, such as DNA extraction, with their children. For other parents, though, it was sometimes a different story. *'I think my child would enjoy doing something science-related but I just don't know where to start'*, one parent told us.

We can see from these results that lockdown is likely to have amplified an existing situation of science 'haves' and 'have-nots'. In many cases, affluent children from scientifically minded households continued to receive school science teaching, bolstered by parental input, while those in areas of deprivation whose parents do not have a science background did no science activity at all.

It is tempting to look at these results focusing on primary-age children and assume that we have got plenty of time to rectify matters. But if we are to attract young people from lower socio-economic status backgrounds into science, we need to get to them young. Research has shown that children's attitudes to science education and careers are fixed at an early age; in fact, mindsets are largely fixed by the age of ten. Primary school science is, therefore, crucial to the effort to widen participation in this field. What could be the effect of suddenly whipping it away for several months? In 10 years' time, will we see a cohort of science students from a narrower range of backgrounds than is currently the case?

It is understandable that much science catch-up effort will go into catching up with missed curriculum work for GCSE students. However, it's important that the organisations supporting such activity also work with primary schools, and that schools in their turn recognise the importance of keeping the science flame alive for the under-10s so that they can see it as part of their future.



Percentage of teachers who felt negative about translating the science curriculum for home learning.

Fortunately, some organisations are rising to the challenge. Many university widening participation teams are developing science resources, with some using innovative strategies such as distributing via food banks to get them to target families. Some are also bidding for National Tutoring Programme funds to run enrichment activities with primary-age children. My own institution, the University of Central Lancashire, has a number of activities and ideas available via its Young Scientist Centre and the Lancashire Science Festival. Resources are also available from a wide variety of charities and other science organisations; a few are listed at the bottom of the article.

Primary teachers have a lot on their plate at the moment, what with handwashing, sterilising surfaces, catching up across the syllabus and the constant possibility of a bubble being sent home. However, making time to take advantage of some of the resources available could switch the next Curie or Darwin back on to science just in time – and make all of our futures brighter.

Science enrichment resources

ASE: https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources

UClan and Ri Young Scientist Centre: https://www.uclan.ac.uk/schools_colleges/young-scientist-centre.php

Lancashire Science Festival: https://lancashiresciencefestival.co.uk/experiments/

UK Space Agency: https://www.gov.uk/government/publications/space-related-educational-resources/space-related-educational-resources

British Science Week 2020: https://www.britishscienceweek.org/app/uploads/2020/02/BSA_BSW_Primary_1019v20-2-1.pdf

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ASE Remote Learning Resources – Primary

In 2020, ASE published an extensive series of free resources – available to both teachers and home educators – to help deliver lessons remotely.

Members of the ASE primary science community worked together (remotely!) to write lessons for primary-aged pupils, which have been specifically designed to help deliver a structured series of topic-based primary science lessons in a home environment. There are two topics for each year group, and each lesson can be accessed as a PowerPoint document.

These are still available! See www.ase.org.uk/resources/remote-learning-resources-primary